Fama French Five Factor Asset Pricing Model

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Abstract:

In 2015 Fama and French proposes a five-factor model by adding profitability and investment factors to their three-factor model. Fama and French Five factor model outperforms the three-factor model previously proposed by Fama and French (1993). Many researchers find that five factor model explains assets pricing anomalies better than the range of competing assets pricing models. But the main problem with five-factor model is its failure to capture the low average returns on small stocks whose returns behave like those firms who invests a lot despite low profitability. The model's performance is not sensitive to the way its factors are defined.

Keywords: Fama and French three-factor model; Fama and French five-factor model; Capital assets pricing model; Dividend discount model; Profitability; Investment

Introduction:

From long time the relationship between the risk and return is topic of discussion and research. Financial Economics there is concern that how estimating assets returns. Different models and methods have been developed over the year for pricing securities and determine the return on our capital investments. In the beginning of 1964 Capital Assets pricing model, which is also known as single factor model has been developed. The single factor was beta which states how much price will move as compared to the market. Higher the Beta it means that the stocks have moved more than the market and thus higher the risk higher the return (Demuth, 2014).

In 1993 Fama and French three factor model came with its two additional factor size and value. This three-factor model was significant improvement in CAPM model over the period. It expands the capital assets pricing model by adding size risk and value risk factor in CAPM. This model considers that small- caps stock and the value outperform the markets on a regular basis.

The traditional capital assets pricing model uses only one variable to describe the returns of a portfolio or stocks with the return of the market. Fama and French uses the three variables and observed that two classes of assets (i) small caps and (ii) stock with high book-to- market ratio are performed better than market. Then they added the two factors to CAPM to reflect a portfolio's exposure.

Two alternatives are available to estimating the assets return: Single Factor model or capital assets pricing model (CAPM) by Sharpe (1964) and Linter (1965), and the second one is the Three Factor Model suggested by Fame and French (1992). CAPM model explains stock returns as a function of market return. Fama and French model is alternative of CAPM model.

Application of Five Factor Model:

Nobel Laureate Eugene Fama and researcher Kenneth French, attempted to find out the measure of market returns, and research found that value stocks outperform growth stock. Similarly, large-cap stocks outperformed by small- cap stocks. The Fama and French model has three factors: size of the firm, excess return on the market and book-to- market values.

Lot of debate exists about outperformance tendency that weather that is due to market efficiency or inefficiency. In support of market efficiency, outperformance is excess risk faced by value and small- cap stocks because of higher cost of capital and greater business risk. While incorrectly pricing of these companies, which provides the excess return in the long run as the value adjusts, supports the market inefficiency.

Fama and French use the dividend discount model to get two new factors, investment, and profitability (Fama and French, 2014). The five-factor model aim to explain average returns on portfolios. Firstly, the model is applicable on portfolios formed on size, B/M, profitability, and investment. Secondly the five-factor model has been comparing with three factor model's performance to explain the average return associated with major anomalies not targeted by the model (Fama and French, 2014).

The results show that Fama and French five factor model explains between 71% and 94% of the diversified portfolios return. Five-factor model captures the size, value, profitability, and investment patterns in average stock returns performs better than the three-factor model. The new model shows that highest returns companies can attain weather the company is small,

profitable and company has no major growth prospect. However, the setback of five factor model is momentum factor was not included in the model. Foye (2018) tested the five-factor model in the UK and raises some serious concerns. five-factor model in the UK and raises some serious concerns tested by Foye (2018).

Fama and French Five factor model formula:

$$R_{it} - R_{Ft} = a_i + b_i(R_{Mt} - R_{Ft}) + s_iSMB_t + h_iHML_t + r_iRMW_t + c_iCMA_t + e_{it}$$

Rit= Expected rate of return in the t

Rft = Risk-free rate

Rm- Rf = Return spread between the capitalization weighted stock market and cash

SMB (Small Minus Big) = Historic excess returns of small-cap companies over large- cap companies

HML (High Minus Low) = Historic excess returns of value stocks (high book-to-price ratio) overgrowth stocks (low book-to-price ratio)

RMV= Return spread of the most profitable firm minus least profitable firm CMA= Return spread of the firm that invest conservatively minus aggressively.

This regression test observe whether the five-factor model captures average returns on the variables and which variables are positively or negatively correlated to each other and additionally identifying the size of the regression slopes and how all these factors are related to and affect average returns of stocks values.

Fama and French done the test (Fama and French.2014) shows that the value of HML redundant for describing the average returns when in the equation profitability and investment factor has been added, but if portfolio tilts are also of interest in addition to abnormal returns then the five-factor model is best to use.

Limitations:

- There is no clarity whether HML and SMB capture risk or just persistent mistakes by investors
- Its Ignores the Momentum and Low Volatility

- It is unlikely to lead to academic consensus
- Alternative models who are competing five- factor model is already being proposed

Conclusion:

The five-factor model has yet to improve compared to previous models. There is lot of room to develop further new models in the future. Most of investors still use the famous three factor model. Until this method proves itself in the empirical evidence it would be in the best interest for the investors to use the other factor models.

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